INTERVERTEBRAL PROSTHESIS OR DISK PROSTHESIS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 14/638,196, filed on Mar. 4, 2015, which is a continuation of U.S. application Ser. No. 11/587,723, filed on Sep. 4, 2007, which is a national stage entry pursuant to 35 U.S.C. §371 of International Application No. PCT/CH04/00250. Each of the above applications is hereby incorporated herein by reference in its entirety.

FIELD

The invention relates to an intervertebral prosthesis or disk prosthesis, especially for arthrodesis surgery by means of dorsal access PLIF (posterior lumbar interbody fusion), TLIF (transforaminal lumbar interbody fusion), ELIF (extraforaminal lumbar interbody fusion), ALIF (anterior lumbar interbody fusion) and ACIF (anterior cervical interbody fusion. The objective of this surgical technique is the treatment of a degenerated or otherwise diseased intervertebral disk. The surgeon looks for access to the intervertebral disk through a centrally placed skin incision. Subsequently, he exposes the rear region of the movement segments, especially the laminae and the pedicle entry points. By means of a partial resection of the facettal and laminar components, the surgeon aims past the nerve roots and the medullary space in the direction of the diseased intervertebral disk.

BACKGROUND

For this surgical technique, only a limited amount of autologous spongiosa is available for filling the cavities of cage-like intervertebral or disk prosthesis and the spaces between individual implants and their surroundings. In the long term, the arthrodesis takes place not with the implant but between the bone and the bone replacement material. The individual implants therefore function only as place holders or spacers.

The intervertebral spaces, supplied with the known intervertebral implants, therefore frequently do not attain complete arthrodesis, that is, they end in a pseudoarthrosis. The situation is much the same also with cage-like intervertebral implants for the cervical spine, as well as for those, which were inserted through ventral entrances. Such intervertebral spaces are not stable mechanically, as would have been expected from a stiffening. The consequences then may be recurring pain with subsequent revision surgery.

For the implants and surgical techniques described above, the surgeon uses autologous bone material, which he obtains from the resected parts of the vertebral body or by means of an additional intervention in the crest of the ilium. Since dorsal accesses to the intervertebral disk space are very narrow, the applying of bone material is made difficult. The surgeon is unable to ensure that the whole of the intervertebral space is filled with autologous bone material. There is therefore the danger that empty spaces will result which, on the one hand, permits migration of the implant. On the other hand, the spaces, not filled with autologous bone material, are filled by a soft, fibrous tissue.

SUMMARY

It is an object of the invention to provide an intervertebral prosthesis or a disk prosthesis, which makes an asymmetric emergence of the osteocementum possible, so that individual regions between the vertebral bodies (for example the central and posteriors zones) are automatically supplied with more osteocementum than other regions.

This objective is accomplished by an intervertebral prosthesis or disc prosthesis, for which the outlet openings are dimensioned differently in size. The amount of osteocementum K_L, emerging through S_L is either larger or smaller than the amount of osteocementum K_R emerging through S_R; or the amount of osteocementum K_H, emerging through S_H, is larger or smaller than the amount of osteocementum K_V emerging through S_V.

In other words, the outlet openings are dimensioned so that, when flowable osteocementum is supplied through the inlet opening into the cavity, the amount of osteocementum K_L emerging through S_L is either larger or smaller than the amount of osteocementum K_R emerging through S_R or the amount of osteocementum K_H, emerging through S_H, is larger or smaller than the amount of osteocementum K_V, emerging through S_V.

The invention permits the intervertebral space to be filled with synthetic bone material (osteocementum) after the cage-like intervertebral prosthesis or disk prosthesis has been placed. The implant is secured by the emergence and subsequent curing of the flowable, hydraulic osteocementum. Due to the asymmetric arrangement of the outlet openings in the implant, the osteocementum can be spread selectively. The inventive prosthesis furthermore has the advantage that it makes superfluous the additional removal of bone at the crest of the iliac, which can cause long enduring pain.

In a special embodiment, the inlet opening is provided in the front side of the prosthesis and the cavity extends from the inlet opening in the direction of the rear side.

In the case of a further embodiment, the inlet opening is disposed in the left all right side of the prosthesis and the cavity extends from the inlet opening in the direction of the opposite right or left side.

In the case of a further embodiment, the cross section of the cavity decreases at least on a partial section as the distance from the inlet opening increases. Due to the tapering of the cavity, the liquid cement mixture flows more easily through the side openings of the implant. The wall of the implant in the opening opposite the injection point has a shearing-off edge, so that the liquid cement mixture is diverted.

In the case of a further embodiment, the cavity tapers, at least on a partial section, either in wedge-shaped or conical fashion. In the case of a further embodiment, the upper and lower sides converge in the direction of the front side at least on a partial section. In yet another embodiment, the prosthesis is filled at least partially with a cured hydraulic osteocementum, which extends at least partially beyond the outlet opening.

In the case of a further embodiment, the implant may consist of two intervertebral prostheses, which are disposed next to one another, the right side of the intervertebral prosthesis disposed on the left being oriented in the direction of the left side of the intervertebral prosthesis disposed on the right. For the intervertebral prosthesis disposed on the left, the condition $S_L > S_R$ applies and for the intervertebral prosthesis on the right, the condition $S_R > S_L$.

Moreover, the intervertebral prosthesis may be varied in many ways, for example, by using flat, concave, convex or also spherical side walls.

Calcium phosphate cements, which, after the two components are mixed, may be injected in liquid form into the implant and are subsequently cured hydraulically, are suitable as flowable hydraulic osteocementum.